



Service Manual

216B SKID STEER LOADER

Tip: Use Bookmarks panel to navigate

Printed by Heavy Equipment Manuals
v2.20

Printed in U.S.A

[Heavy Equipment Manuals](#)

KENR6948-04 C1.5 and C2.2 Engines for Caterpillar Built Machines _____	2
REN4893-03 216B, 216B2, 226B, 226B2, 232B, 232B2, 242B and 242B2 _____	281
REN4894-05 216B, 226B, 232B and 242B Skid Steer Loaders Power Train _____	386
REN4898-03 216B, 216B2, 226B, 226B2, 232B, 232B2, 242B and 242B2 Skid Steer Loaders Machine Systems _____	545
SEN5006-04 3024C Engine for Caterpillar Built Machines _____	798
UENR3262-00 Seal Installation _____	1006

Alternator - Remove and Install - 55 Amp Alternator _____	4
Alternator - Remove and Install - 65 Amp and 85 Amp Alternators _____	7
Bearing Clearance - Check _____	11
Camshaft - Assemble _____	14
Camshaft - Disassemble _____	16
Camshaft - Install _____	18
Camshaft - Remove _____	22
Connecting Rod Bearings - Install - Connecting rods in position _____	26
Connecting Rod Bearings - Remove - Connecting rods in position _____	29
Coolant Temperature Switch - Remove and Install _____	31
Crankcase Breather - Remove and Install - Naturally Aspirated Engines ____	34
Crankcase Breather - Remove and Install - Turbocharged Engines _____	39
Crankshaft - Install _____	44
Crankshaft - Remove _____	48
Crankshaft Front Seal - Remove and Install _____	51
Crankshaft Main Bearings - Install _____	55
Crankshaft Main Bearings - Remove _____	60
Crankshaft Pulley - Remove and Install _____	64
Crankshaft Rear Seal - Remove and Install _____	67
Crankshaft Wear Sleeve (Rear) - Remove and Install _____	71
Cylinder Head - Install _____	77
Cylinder Head - Remove _____	82
Electric Starting Motor - Remove and Install _____	87
Engine Oil Cooler - Remove and Install _____	90
Engine Oil Line - Remove and Install _____	94
Engine Oil Pan - Remove and Install _____	99
Engine Oil Pressure Switch - Remove and Install _____	103
Engine Oil Pump - Install _____	108
Engine Oil Pump - Remove _____	114
Engine Oil Relief Valve - Remove and Install _____	119

Exhaust Manifold - Remove and Install _____	123
Fan - Remove and Install _____	127
Flywheel - Install _____	130
Flywheel - Remove _____	134
Flywheel Housing - Remove and Install - Engines with Flywheel Housing and Back Plate _____	137
Flywheel Housing - Remove and Install _____	143
Fuel Filter Base - Remove and Install _____	146
Fuel Injection Lines - Remove and Install _____	150
Fuel Injection Pump - Remove and Install _____	157
Fuel Injector - Remove and Install _____	163
Fuel Shutoff Solenoid - Remove and Install _____	167
Fuel Transfer Pump - Remove and Install - Electrical Fuel Transfer Pump ____	170
Fuel Transfer Pump - Remove and Install - Mechanical Fuel Transfer Pump .	173
Glow Plugs - Remove and Install _____	177
Housing (Front) - Assemble _____	180
Housing (Front) - Disassemble _____	189
Housing (Front) - Install _____	196
Housing (Front) - Remove _____	200
Inlet and Exhaust Valve Springs - Remove and Install _____	203
Inlet and Exhaust Valves - Remove and Install _____	210
Lifter Group - Remove and Install _____	219
Pistons and Connecting Rods - Assemble _____	223
Pistons and Connecting Rods - Disassemble _____	229
Pistons and Connecting Rods - Install _____	235
Pistons and Connecting Rods - Remove _____	238
Rocker Shaft - Assemble _____	241
Rocker Shaft - Disassemble _____	244
Rocker Shaft and Pushrod - Install _____	247
Rocker Shaft and Pushrod - Remove _____	250

Turbocharger - Remove and Install _____	253
Valve Mechanism Cover - Remove and Install _____	259
V-Belts - Remove and Install _____	264
Water Pump - Remove and Install _____	267
Water Temperature Regulator - Remove and Install _____	273
Water Temperature Regulator Housing - Remove and Install _____	277

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i02601956

Alternator - Remove and Install - 55 Amp Alternator

SMCS - 1405-010

Removal Procedure

Start By:

- a. Remove the V-Belt. Refer to Disassembly and Assembly, "V-Belts - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Turn the battery disconnect switch to the OFF position.
 2. Make temporary identification marks on the connections of the harness assembly.
-

This is the sample of the manual

**Click on the download link for
complete manual**

Download Link

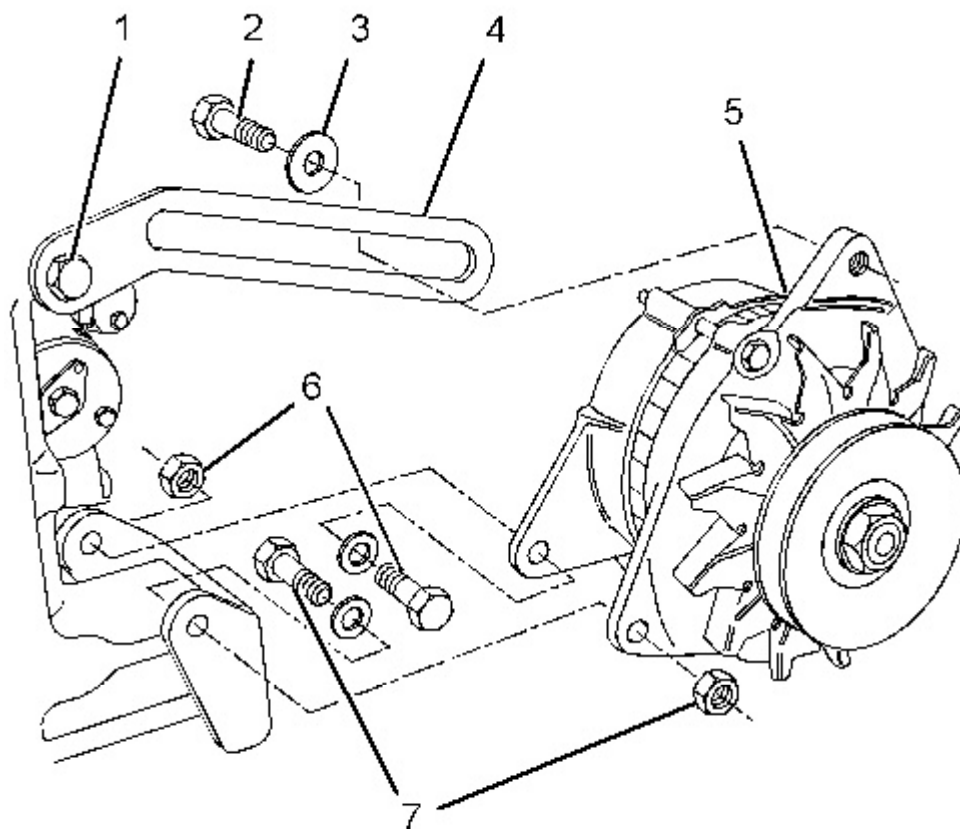


Illustration 1
Typical example

g01308282

3. Disconnect the harness assembly (not shown) from alternator (5).
4. Remove bolt (2) and washer (3) from alternator (5).
5. Remove fasteners (6) and (7) and remove alternator (5) from the mounting bracket.
6. If necessary, remove bolt (2) and remove adjusting link (4).

Installation Procedure

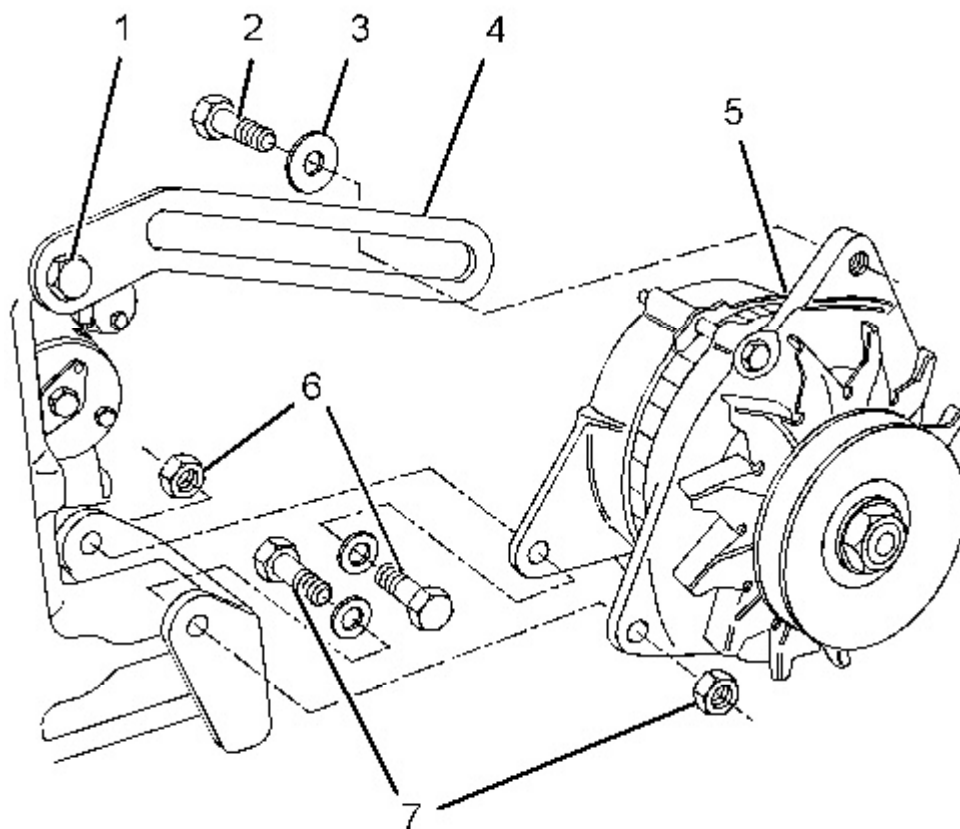


Illustration 2
Typical example

g01308282

1. If necessary, install adjusting link (4) and install bolt (1) finger tight.
2. Position alternator (5) on the mounting bracket.
3. Install fasteners (6) and (7) finger tight.
4. Install bolt (2) and washer (3) finger tight.
5. Install the V-Belt. Refer to Disassembly and Assembly, "V-Belts - Remove and Install".

Note: Ensure that the alternator pulley is in alignment with the crankshaft pulley. Ensure that all fasteners are tightened.

6. Connect the harness assembly (not shown) to the alternator.
7. Turn the battery disconnect switch to the ON position.

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i02601962

Alternator - Remove and Install - 65 Amp and 85 Amp Alternators

SMCS - 1405-010

Removal Procedure

Start By:

- a. Remove the V-Belt. Refer to Disassembly and Assembly, "V-Belts - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Turn the battery disconnect switch to the OFF position.
 2. Make temporary identification marks on the connections of the harness assembly.
-

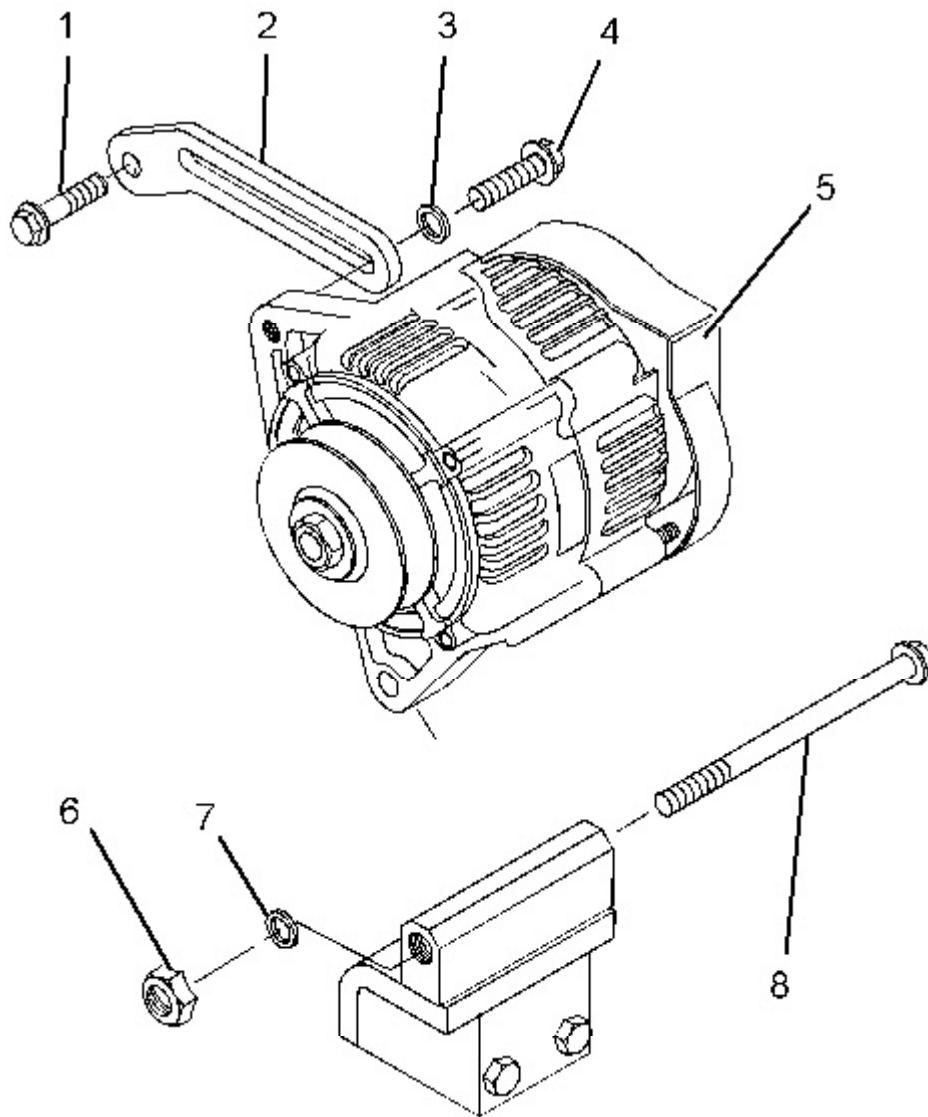


Illustration 1
Typical example

g01308285

3. Disconnect the harness assembly (not shown) from alternator (5).
4. Remove bolt (4) and washer (3) from alternator (5).
5. Remove washer (7) and nut (6). Remove bolt (8) and alternator (5) from the mounting bracket.
6. If necessary, remove bolt (1) and remove adjusting link (2).

Installation Procedure

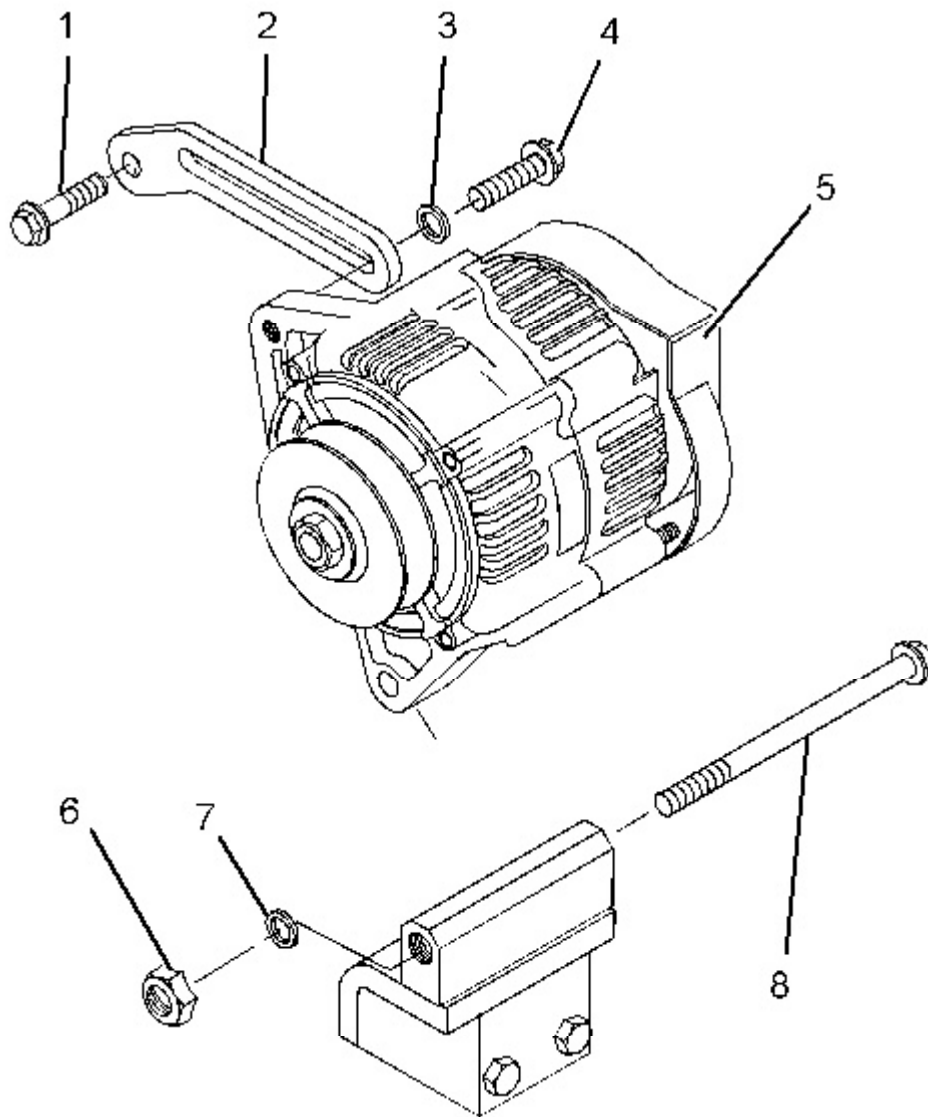


Illustration 2
Typical example

g01308285

1. If necessary, install adjusting link (2) and install bolt (1) finger tight.
2. Position alternator (5) on the mounting bracket.
3. Install bolt (8), washer (7) and nut (6) finger tight.
4. Install bolt (4) and washer (3) finger tight.
5. Install the V-Belt. Refer to Disassembly and Assembly, "V-Belts - Remove and Install".

Note: Ensure that the alternator pulley is in alignment with the crankshaft pulley. Ensure that all fasteners are tightened.

6. Connect the harness assembly (not shown) to the alternator.

7. Turn the battery disconnect switch to the ON position.

Previous Screen

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i02237832

Bearing Clearance - Check

SMCS - 1203-535; 1219-535

Measurement Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	198-9142	Plastic Gauge (Green) 0.025 to 0.076 mm (0.001 to 0.003 inch)	1
	198-9143	Plastic Gauge (Red) 0.051 to 0.152 mm (0.002 to 0.006 inch)	1
	198-9144	Plastic Gauge (Blue) 0.102 to 0.229 mm (0.004 to 0.009 inch)	1
	198-9145	Plastic Gauge (Yellow) 0.230 to 0.510 mm (0.009 to 0.020 inch)	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Caterpillar does not recommend the checking of the actual bearing clearances particularly on small engines. This is because of the possibility of obtaining inaccurate results and the possibility of damaging the bearing or the journal surfaces. Each Caterpillar engine bearing is quality checked for specific wall thickness.

Note: The measurements should be within specifications and the correct bearings should be used. If the crankshaft journals and the bores for the block and the rods were measured during disassembly, no further checks are necessary. However, if the technician still wants to measure the bearing clearances, Tooling (A) is an acceptable method. Tooling (A) is less accurate on journals with small diameters if clearances are less than 0.10 mm (0.004 inch).

NOTICE

Lead wire, shim stock or a dial bore gauge can damage the bearing surfaces.

The technician must be very careful to use Tooling (A) correctly. The following points must be remembered:

- Ensure that the backs of the bearings and the bores are clean and dry.
- Ensure that the bearing locking tabs are properly seated in the tab grooves.
- The crankshaft must be free of oil at the contact points of Tooling (A).

1. Put a piece of Tooling (A) on the crown of the bearing that is in the cap.

Note: Do not allow Tooling (A) to extend over the edge of the bearing.

2. Use the correct torque-turn specifications in order to install the bearing cap. Do not use an impact wrench. Be careful not to dislodge the bearing when the cap is installed.

Note: Do not turn the crankshaft when Tooling (A) is installed.

3. Carefully remove the cap, but do not remove Tooling (A). Measure the width of Tooling (A) while Tooling (A) is in the bearing cap or on the crankshaft journal. Refer to Illustration 1.
-

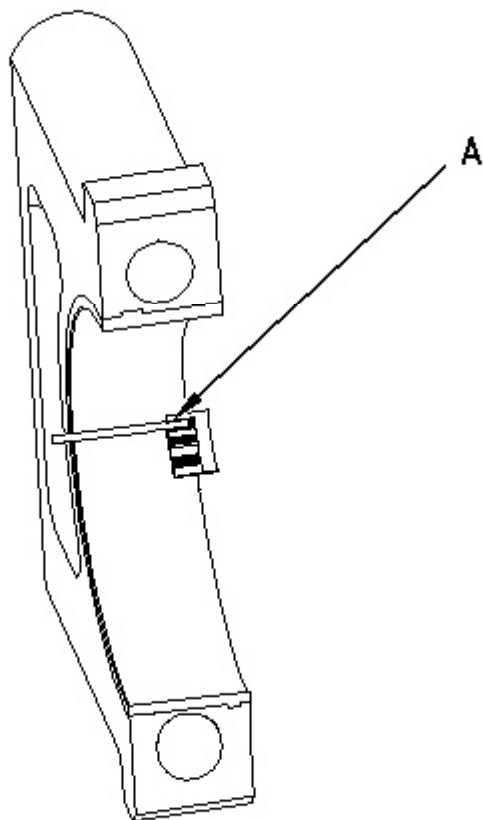


Illustration 1
Typical Example

g00953605

4. Remove all of Tooling (A) before you install the bearing cap.

Note: When Tooling (A) is used, the readings can sometimes be unclear. For example, all parts of Tooling (A) are not the same width. Measure the major width in order to ensure that the parts are within the specification range. Refer to Specifications Manual, "Connecting Rod Bearing Journal" and Specifications Manual, "Main Bearing Journal" for the correct clearances.

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i02601967

Camshaft - Assemble

SMCS - 1210-016

Assembly Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that all components of the camshaft assembly are clean and free from damage.
-

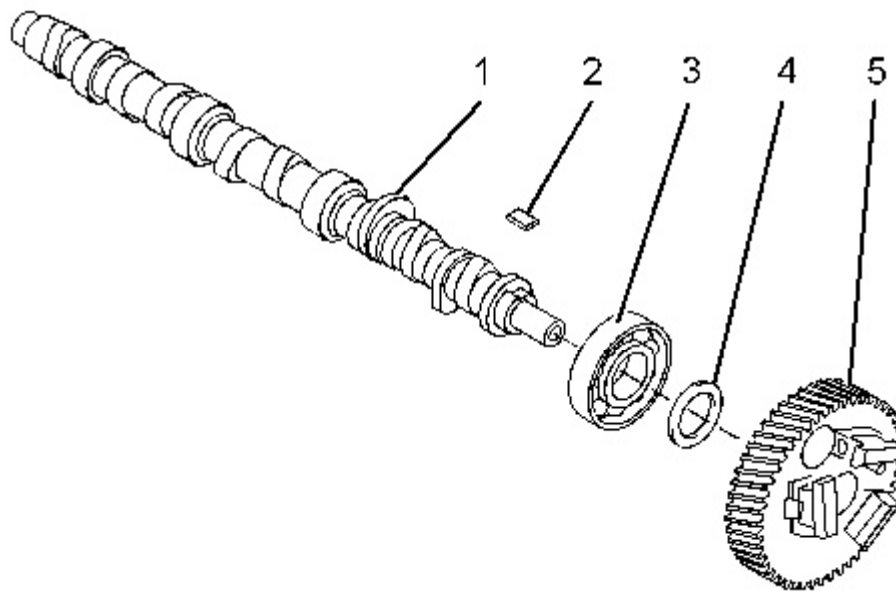


Illustration 1

g01326129

Typical example

2. Lubricate the nose of camshaft (1) with clean engine oil. Use a suitable press to install bearing (3) to the camshaft.

Note: Ensure that the bearing is installed in the correct orientation. The camshaft bearing should be pressed squarely onto the camshaft or damage to the bearing may occur. Do not press on the outer race of the bearing.

3. Install spacer (4) and woodruff key (2) to camshaft (1).
4. Align gear (5) with woodruff key (2). Use a suitable press to install the gear to the nose of camshaft (1).

Note: The gear should be positioned on a suitable support in order to prevent damage to the governor flyweights during installation.

End By:

- a. Install the camshaft assembly. Refer to Disassembly and Assembly, "Camshaft - Install".

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i02601970

Camshaft - Disassemble

SMCS - 1210-015

Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Name	Qty
A	1P-2320	Combination Puller	1

Start By:

- Remove the camshaft assembly. Refer to Disassembly and Assembly, "Camshaft - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

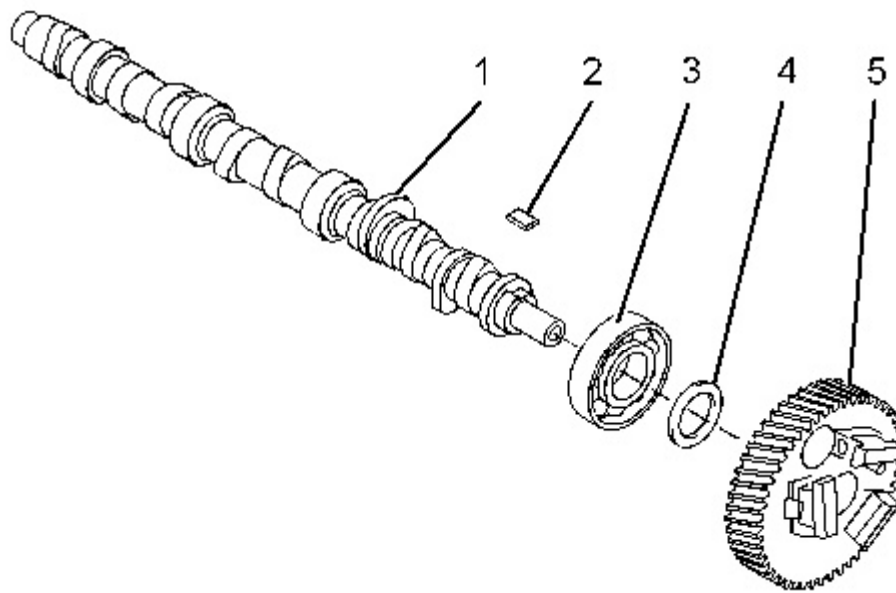


Illustration 1

g01326129

Typical example

1. Use Tooling (A) to remove gear (5) from camshaft (1).

Note: The gear should be positioned on a suitable support in order to prevent damage to the governor flyweights during disassembly.

2. Remove spacer (4) and woodruff key (2) from camshaft (1).
3. Use Tooling (A) to remove bearing (3) from camshaft (1).

Note: Identify the orientation of the bearing for installation.

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i06721482

Camshaft - Install

SMCS - 1210-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the assembly of the camshaft is clean and free from damage.
 2. Lubricate the bearings of the camshaft with clean engine oil.
-

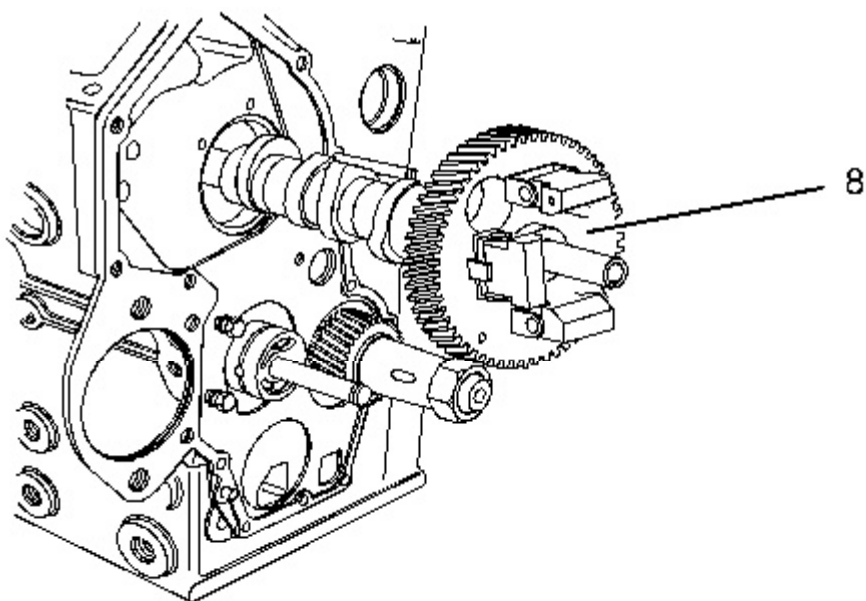


Illustration 1
Typical example

g01311416

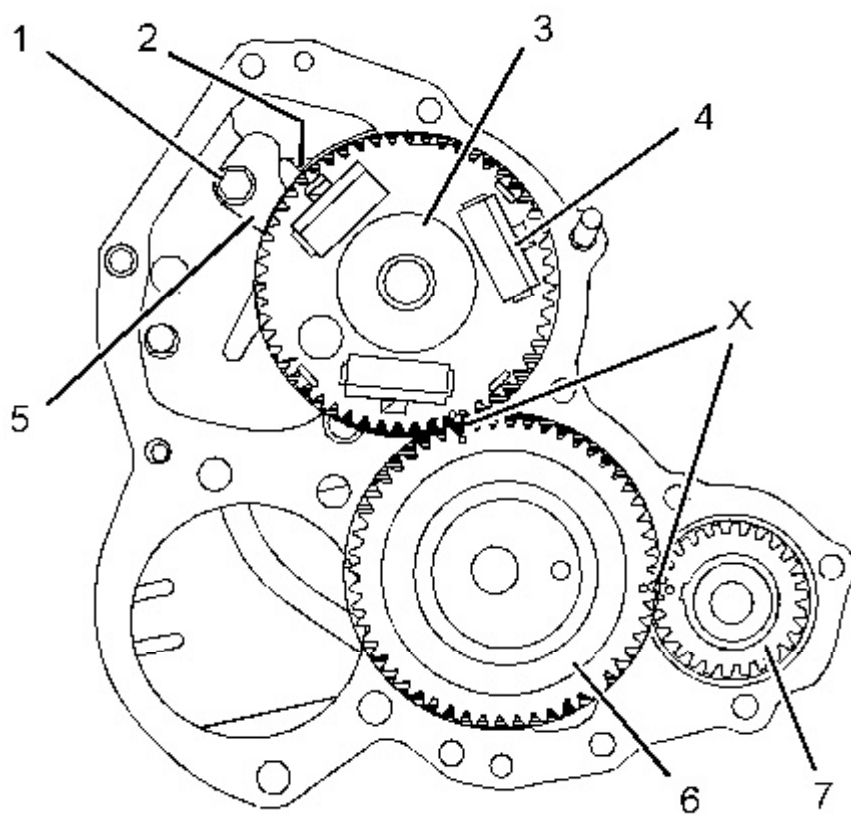


Illustration 2

g01311407

Typical example

3. Carefully install camshaft assembly (8) into the cylinder block. Ensure that timing marks (X) are aligned on the following gears:
 - Crankshaft gear (7)
 - Camshaft gear (4)
 - Idler gear (6)

Note: Do not damage the lobes of the camshaft or the camshaft bearings.

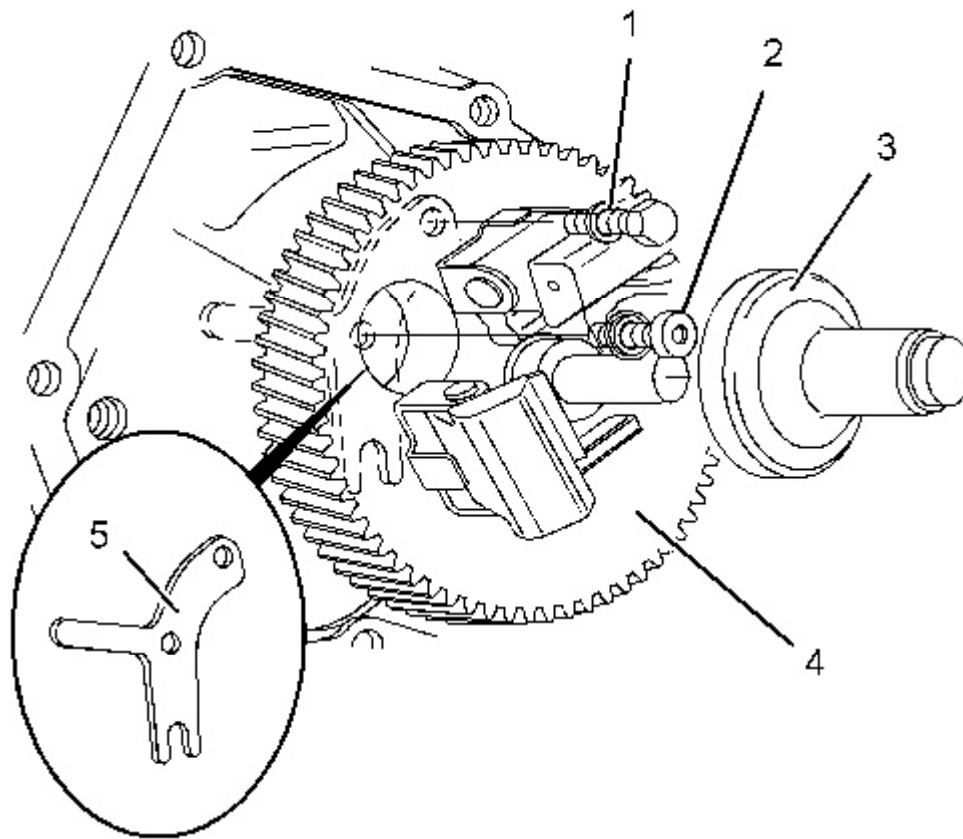


Illustration 3

g01311411

Typical example

4. Place camshaft retainer (5) in position. Align the holes in the retainer with the holes in the cylinder block.
5. Rotate camshaft gear (4) to align the access hole in the camshaft gear with the hole for fastener (2).

Install bolt (2) and tighten to a torque of 10 N·m (89 lb in). Rotate camshaft gear (4) to align the access hole in the camshaft gear with the hole for bolt (1). Install bolt (1) and tighten to a torque of 10 N·m (89 lb in).

6. Install slider (3) to camshaft gear (4).
7. If the engine is equipped with a mechanical fuel transfer pump, install the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Remove and Install".

End By:

- a. Install the lifters. Refer to Disassembly and Assembly, "Lifter Group- Remove and Install".
- b. Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i06721478

Camshaft - Remove

SMCS - 1210-011

Removal Procedure

Start By:

- Remove the lifters. Refer to Disassembly and Assembly, "Lifter Group - Remove and Install".
- Remove the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

-
1. If the engine is equipped with a mechanical fuel transfer pump, remove the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Remove and Install".
-

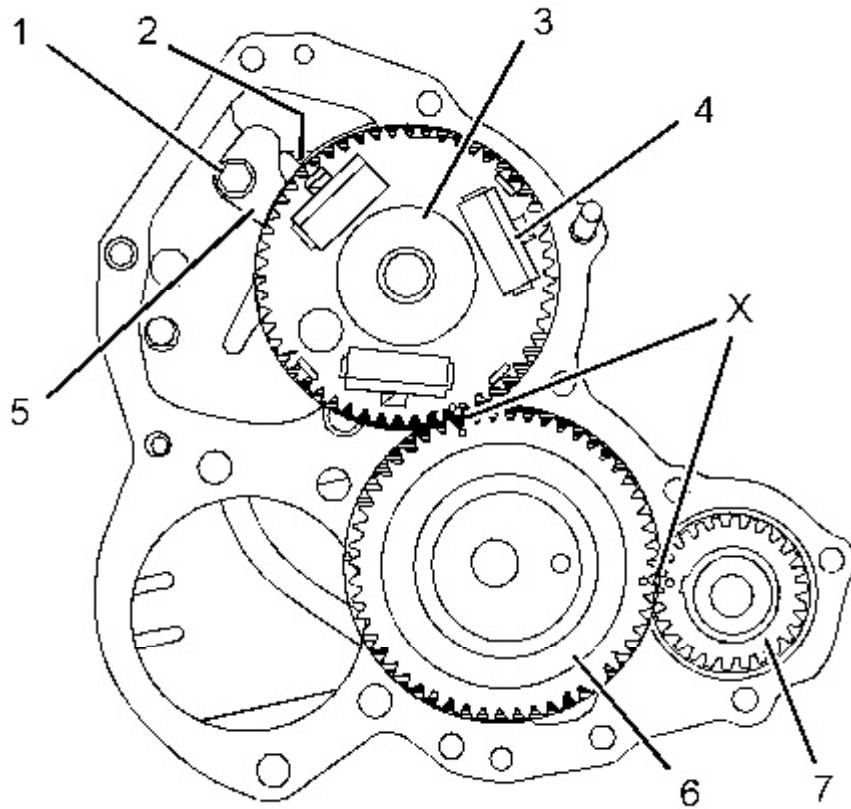


Illustration 1
Typical example

g01311407

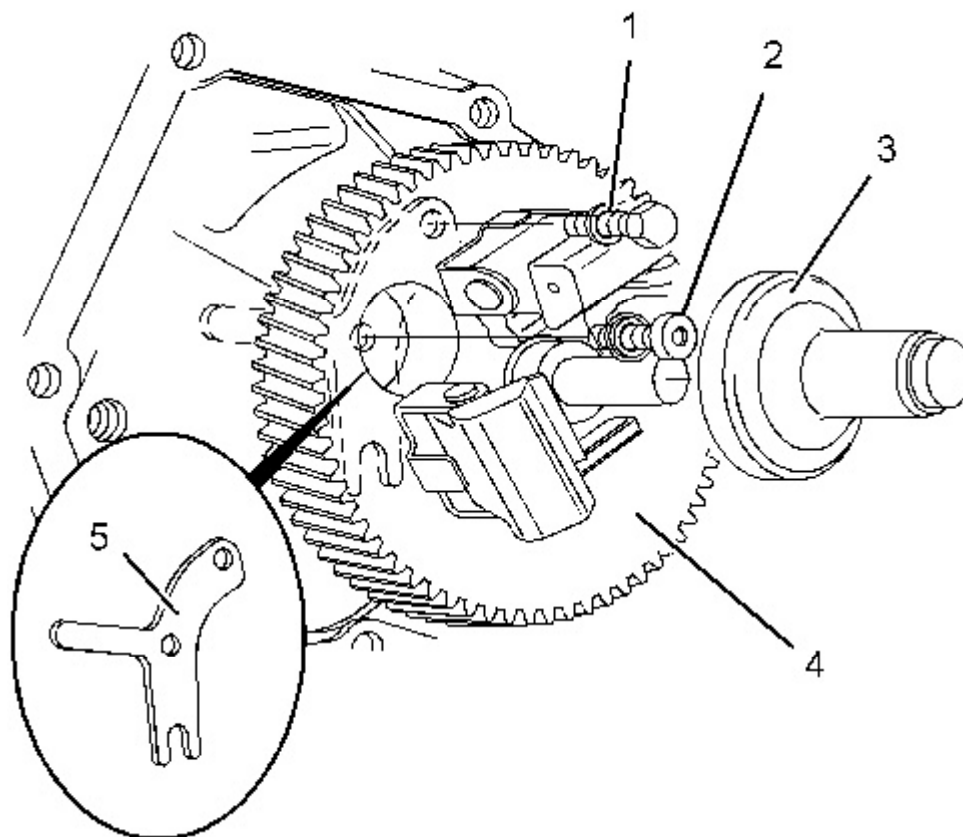


Illustration 2
Typical example

g01311411

2. Remove slider (3) from camshaft gear (4).
3. Rotate camshaft gear (4) to align the access hole in the camshaft gear with fastener (2).

Remove bolt (2). Rotate camshaft gear (4) to align the access hole in the camshaft gear with bolt (1).
Remove bolt (1).

4. Remove camshaft retainer (5).
5. Rotate the crankshaft until timing marks (X) are aligned on the following gears:
 - Crankshaft gear (7)
 - Camshaft gear (4)
 - Idler gear (6)

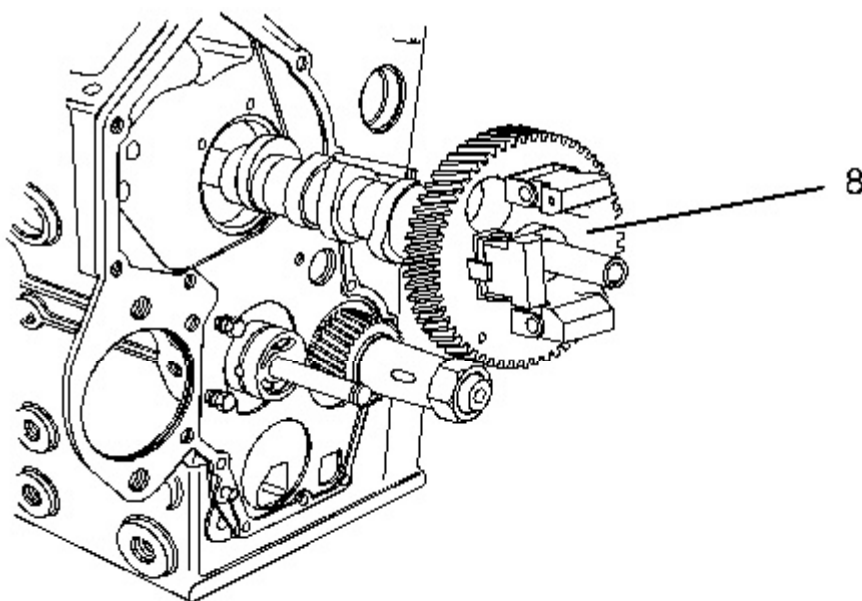


Illustration 3
Typical example

g01311416

6. Carefully remove camshaft assembly (8) from the cylinder block.

Note: Ensure that the lobes of the camshaft and the camshaft bearings are not damaged.

[Previous Screen](#)

Product: SKID STEER LOADER

Model: 216B SKID STEER LOADER RLL04537

Configuration: 216B 226B 232B 242B Skid Steer Loader RLL00001-06799 (MACHINE) POWERED BY 3024C Engine

Disassembly and Assembly

C1.5 and C2.2 Engines for Caterpillar Built Machines

Media Number -KENR6948-04

Publication Date -01/06/2015

Date Updated -30/06/2016

i06721485

Connecting Rod Bearings - Install - Connecting rods in position

SMCS - 1219-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Inspect the pins of the crankshaft for damage. If the crankshaft is damaged, replace the crankshaft or recondition the crankshaft. Refer to Disassembly and Assembly, "Crankshaft - Remove" and Disassembly and Assembly, "Crankshaft - Install". Ensure that the connecting rod bearings are clean and free from wear or damage. If necessary, replace the connecting rod bearings.
-

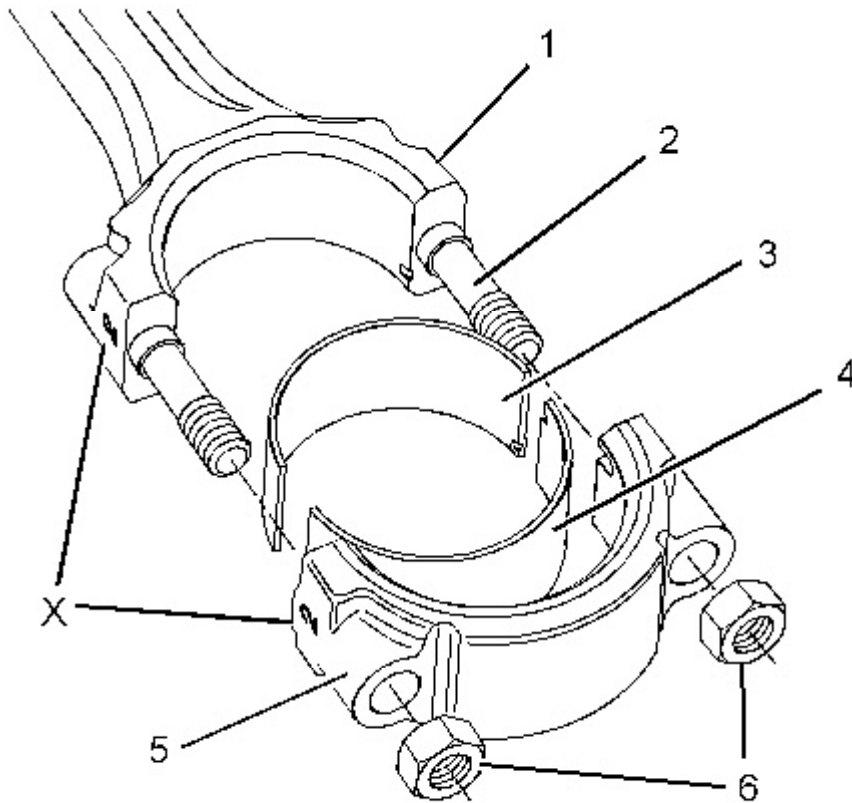


Illustration 1
Typical example

g01317759

2. Clean the bearing surface of connecting rod (1) and connecting rod cap (5). Ensure that number (X) on connecting rod cap (5) aligns with number (X) on connecting rod (1).
 3. Install upper connecting rod bearing (3) to connecting rod (1). Lubricate the bearing surface of the connecting rod bearing with clean engine oil.
 4. Carefully pull connecting rod (1) against the crankshaft pin.
- Note:** Use tape or rubber tubing on connecting rod bolts (2) to protect the crankshaft journals. The sharp edges of the connecting rod bolts could damage the crankshaft journals.
5. Clean the connecting rod cap. Install lower connecting rod bearing (4) to connecting rod cap (5).
 6. Lubricate the pin of the crankshaft and lubricate lower connecting rod bearing (3) with clean engine oil.

NOTICE

When the connecting rod caps are installed, ensure that the identification marks are aligned.

7. Install connecting rod cap (5).
8. Install nuts (4). Tighten nuts to a torque of 52 N·m (38 lb ft).
9. Ensure that the installed connecting rod assembly has tactile side play. Carefully rotate the crankshaft to ensure that there is no binding.

Note: If all connecting rod bearings require replacement on a four cylinder engine, the procedure can be carried out on two cylinders at the same time. The procedure can be carried out on the following pairs of cylinders. 1 with 4 and 2 with 3. **Ensure that both pairs of the connecting rod bearings are installed before changing from one pair of cylinders to another pair of cylinders.** Refer to Disassembly and Assembly, "Connecting Rod Bearings - Remove" for more information.

End By:

- a. Install the suction pipe. Refer to Disassembly and Assembly, "Engine Oil Pump - Install".

This is the sample of the manual

**Click on the download link for
complete manual**

Download Link